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APPENDIX B

Proposed Rule Amendments to 47 C.F.R. Part 21 and Part 25 of the Commission's rules

1. Section 21.2 is proposed to be amended by adding new paragraphs, in alphabetical order, to read as follows:

Local Multipoint Distribution Service Hub Station. A fixed point-to-multipoint radio station in a Local Multipoint Distribution Service System that provides one-way or two-way communication with Local Multipoint Distribution Service Subscriber Stations.

Local Multipoint Distribution Service System. A fixed point to-multipoint radio system consisting of Local Multipoint Distribution Service Hub Stations and their associated Local Multipoint Distribution Service Subscriber Stations.

Local Multipoint Distribution Service Subscriber Station. Any one of the fixed microwave radio stations located at users' premises, lying within the coverage area of a Local Multipoint Distribution Service Hub Station, capable of receiving one-way communications from or providing two-way communications with the Local Multipoint Distribution Service Hub Station.

Local Multipoint Distribution Service Backbone Link. A point-to-point radio service link in a Local Multipoint Distribution Service System that is used to interconnect Local Multipoint Distribution Service Hub Stations with each other or with the public switched telephone network.

2. Section 21.107 is amended by revising paragraph (b) by deleting the Table entry for the frequency band 27,500 MHz to 29,500 MHz line in the Table, and adding a new line to the Table to read as follows:

§ 21.107 Transmitter power.

(b) ***

Frequency Band (MHz)	Fixed (W)	Mobile (W)	Fixed (dBW)	Mobile (dBW)
*****	*****	*****	*****	*****
27,500 MHz to 28,350 MHz			-52 dBW/Hz	
29,100 MHz to 29,250 MHz			⁵	

⁵ This value is based on the value in §§ 21.1018-21.1021.

3. Amend proposed rule section 21.1002 by adding new subsection (c) as follows:

§ 21.1002 Frequencies

(c) Special requirements for operations in the band 29.1-29.25 GHz

(1)(i) LMDS receive stations operating on frequencies in the 29.1- 29.25 GHz band within a radius of 75 nautical miles of the geographic coordinates provided by a non-GSO MSS licensee pursuant to subsections (c)(2) or (c)(3)(i) (the "feeder link earth station complex protection zone") shall accept any interference caused to them by such earth station complexes and shall not claim protection from such earth station complexes.

(ii) LMDS licensees operating on frequencies in the 29.1-29.25 GHz band outside a feeder link earth station complex protection zone shall cooperate fully and make reasonable efforts to resolve technical problems with the non-GSO MSS licensee to the extent that transmissions from the non-GSO MSS operator's feeder link earth station complex interfere with an LMDS receive station.

(2) At least 45 days prior to the commencement of LMDS auctions, feeder link earth station complexes shall be specified by a set of geographic coordinates in accordance with the following requirements: no feeder link earth station complex may be located in the top eight (8) metropolitan statistical areas ("MSAs"), ranked by population, as defined by the Office of Management and Budget as of June 1993, using estimated populations as of December 1992; two (2) complexes may be located in MSAs 9 through 25, one of which must be Phoenix, AZ (for a complex at Chandler, AZ); one (1) complex may be located in MSAs 26 to 50; three (3) complexes may be located in MSAs 51 to 100, one of which must be Honolulu, Hawaii (for a complex at Waimea); and the two (2) remaining complexes must be located at least 75 nautical miles from the borders of the 100 largest MSAs or in any MSA not included in the 100 largest MSAs. Any location allotted for one range of MSAs may be taken from an MSA below that range.

(3)(i) Any non-GSO MSS licensee may at any time specify sets of geographic coordinates for feeder link earth station complexes with each earth station contained therein to be located at least 75 nautical miles from the borders of the 100 largest MSAs.

(ii) For purposes of subsection (c)(3)(i), non-GSO MSS feeder link earth station complexes shall be entitled to accommodation only if the affected non-GSO MSS licensee reapplies to the Commission for a feeder link earth station complex or certifies to the Commission within sixty days of receiving a copy of an LMDS application that it intends to file an application for a feeder link earth station complex within six months of the date of receipt of the LMDS application.

(iii) If said non-GSO MSS licensee application is filed later than six months after certification to the Commission, the LMDS and non-GSO MSS entities shall still cooperate fully and make reasonable efforts to resolve technical problems, but the LMDS licensee shall not be obligated to re-engineer its proposal or make changes to its system.

(4) LMDS licensees or applicants proposing to operate hub stations on frequencies in the 29.1-29.25 GHz band at locations outside of the 100 largest MSAs or within a distance of 150 nautical miles from a set of geographic coordinates specified under subsection (c)(2) or (c)(3)(i) shall serve copies of their applications on all non-GSO MSS applicants, permittees or licensees meeting the criteria

specified in § 25.257(a). Non-GSO MSS licensees or applicants shall serve copies of their feeder link earth station applications on any LMDS applicant or licensee within a distance of 150 nautical miles from the geographic coordinates that it specified under subsection (c)(2) or (c)(3)(i). Any necessary coordination shall commence upon notification by the party receiving an application to the party who filed the application. The results of any such coordination shall be reported to the Commission within sixty days. The non-GSO MSS earth station licensee shall also provide all such LMDS licensees with a copy of its channel plan.

4. A new Section 21.1018 is proposed to read as follows:

§ 21.1018 LMDS Single Station EIRP Limit.

Point-to-point stations in the 29.1-29.5 GHz band for the LMDS backbone between LMDS hubs shall be limited to a maximum allowable EIRP density per carrier of 23 dBW/MHz in any one megahertz in clear air, and may exceed this limit by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value due to precipitation and only to the extent that the link is impaired.

5. A new Section 21.1019 is proposed to read as follows:

§ 21.1019. LMDS Subscriber Transmissions.

LMDS licensees shall not operate transmitters from subscriber locations in the 29.1-29.25 GHz band.

6. A new Section 21.1020 is proposed to read as follows:

§ 21.1020 Hub Transmitter EIRP Spectral Area, Density Limit.

(a) LMDS applicants shall demonstrate that, under clear air operating conditions, the maximum aggregate of LMDS transmitting hub stations in a Basic Trading Area in the 29.1-29.25 GHz band will not transmit a co-frequency hub-to-subscriber EIRP spectral area density in any azimuthal direction in excess of $X \text{ dBW}/(\text{MHz}\cdot\text{km}^2)$ when averaged over any 4.375 MHz band, where X is defined in Table 1. Individual hub stations may exceed their clear air EIRPs by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value and only to the extent that the link is impaired.

(b) The EIRP aggregate spectral area density is calculated as follows:

$$10\log \left[\frac{1}{A} \sum_{i=1}^N p_i g_i \right] \text{dBW}/\text{MHz}\cdot\text{km}^2$$

where:

N = number of co-frequency hubs in BTA

A = Area of BTA in km²

p_i = spectral power density into antenna of i-th hub (in W/MHz)

g_i = gain of i-th hub antenna at zero degree elevation angle

Each p_i and g_i are in the same 1 MHz

(c) The climate zones in Table 1 are defined for different geographic locations within the US as shown in Appendix 28 of the ITU Radio Regulations and Section 25.254 of the Commission's Rules.

Table 1*

Climate Zone	EIRP Spectral Density (Clear Air) (dBW/MHz-km ²)**
1	-23
2	-25
3,4,5	-26

* LMDS system licensees in two or more BTAs may individually or collectively deviate from the spectral area density computed above by averaging the power over any 200 km by 400 km area, provided that the aggregate interference to the satellite receiver is no greater than if the spectral area density were as specified in Table 1. A showing to the Commission comparing both methods of computation is required and copies shall be served on any affected non-GSO MSS providers.

** See Section 21.1007(c)(i) for the population density of the BTA

7. A new rule Section 21.1021 is proposed to read as follows:

§ 21.1021 Hub Transmitter EIRP Spectral Area Density Limit at Elevation Angles Above the Horizon.

(a) LMDS applicants shall demonstrate that, under clear air operating conditions, the maximum aggregate of LMDS transmitting hub stations in a Basic Trading Area in the 29.1-29.25 GHz band will not transmit a co-frequency hub-to-subscriber EIRP spectral area density in any azimuthal direction in excess of X dBW/(MHz-km²) when averaged over any 5.375 MHz band where X is defined in Table 2. Individual hub stations may exceed their clear air EIRPs by employment of adaptive power control in cases where link propagation attenuation exceeds the clear air value and only to the extent that the link is impaired.

(b) The EIRP aggregate spectral area density is calculated as follows:

$$10 \log \left[\frac{1}{A} \sum_{i=1}^N \text{EIRP}(a_i) \right] \text{ dBW/MHz-km}^2$$

where:

N = number of co-frequency hubs in BTA

A = Area of BTA in km²

EIRP(a) = equivalent isotropic radiated spectral power density of the i-th hub (in W/MHz) at elevation angle a

Table 2*

Elevation Angle (a)	Relative EIRP Density (dBW/MHz-km ²)
$0^\circ \leq a \leq 4.0^\circ$	$EIRP(a) = EIRP(0^\circ) + 20 \log (\sin \lceil x \rceil (1/\lceil x \rceil))$ where $x = (a + 1)/7.5^\circ$
$4.0 < a \leq 7.7^\circ$	$EIRP(a) = EIRP(0^\circ) - 3.85a + 7.7$
$a > 7.7^\circ$	$EIRP(a) = EIRP(0^\circ) - 22$

where a is the angle in degrees of elevation above horizon. EIRP(0°) is the hub EIRP area density at the horizon used in Section 21.1020. The nominal antenna pattern will be used for elevation angles between 0° and 8°, and average levels will be used for angles beyond 8°, where average levels will be calculated by sampling the antenna patterns in each 1° interval between 8° and 90°, dividing by 83.

* LMDS system licensees in two or more BTAs may individually or collectively deviate from the spectral area density computed above by averaging the power over any 200 km by 400 km area, provided that the aggregate interference to the satellite receiver is no greater than if the spectral area density were as specified in Table 1. A showing to the Commission comparing both methods of computation is required and copies shall be served on any affected non-GSO MSS providers.

8. A new rule section 21.1022 as follows:

§ 21.1022 Power Reduction Techniques.

LMDS hub transmitters shall employ methods to reduce average power levels received by non-GSO MSS satellite receivers, to the extent necessary to comply with Sections 21.1020 and 21.1021, by employing the methods set forth below:

(a) Alternate Polarizations. LMDS hub transmitters in the LMDS service area may employ both vertical and horizontal linear polarizations such that 50 percent (plus or minus 10

percent) of the hub transmitters shall employ vertical polarization and 50 percent (plus or minus 10 percent) shall employ horizontal polarization.

(b) Frequency Interleaving. LMDS hub transmitters in the LMDS service area may employ frequency interleaving such that 50 percent (plus or minus 10 percent) of the hub transmitters shall employ channel center frequencies which are different by one-half the channel bandwidth of the other 50 percent (plus or minus 10 percent) of the hub transmitters.

(c) Alternative Methods. As alternatives to (a) and (b) above, LMDS operators may employ such other methods as may be shown to achieve equivalent reductions in average power density received by non-GSO MSS satellite receivers.

Proposed Rule Amendments to 47 C.F.R. Part 25 of the Commission's Rules

Part 25 of the Commission's Rules and Regulations (Chapter I of Title 47 of the Code of Federal Regulations) is proposed to be amended as follows:

1. A new Section 25.257 is proposed to read as follows:

§ Special requirements for operations in the band 29.1-29.25 GHz

- (a) Special requirements for operations in the band 29.1-29.25 GHz

- (1) Non-geostationary mobile satellite service (non-GSO MSS) operators shall use the 29.1-29.25 GHz band for Earth-to-space transmissions from feeder link earth station complexes. For purposes of this subsection, a "feeder link earth station complex" may include up to three (3) earth station groups, with each earth station group having up to four (4) antennas, located within a radius of 75 nautical miles of a given set of geographic coordinates provided by a non-GSO MSS operator pursuant to subsections (c)(5) or (c)(6)(i).

- (2) A maximum of eight (8) feeder link earth station complexes in the contiguous United States, Alaska, and Hawaii may be operated concurrently in the band 29.1-29.25 GHz.

- (b) Coordination of LMDS systems and geostationary fixed satellite systems in the band 29.1-29.25 must be done in accordance with the technical standards of §§ 21.1018-21.1024.